Complying with Washington's Ergonomics Rule:

Ergonomics Awareness Education

Video

Required handouts

- Employee involvement
- WMSDs symptoms
- Requirements of the ergonomics rule

Department of LABOR AND INDUSTRIES

http://www.lni.wa.gov/wisha

Your Involvement in Ergonomics

You are an important part of our ergonomics efforts. During the coming months, we will be analyzing jobs to see if there are hazards present. If we find hazards, we'll be working together to try to find solutions, and then checking to make sure that any solutions we come up with are working.

Some of your co-workers have been asked to help with analyzing these jobs:

_____

_____

_____

_____

You are the expert in your job

They may be coming to talk to you about your job and maybe watch you work. Be sure to share any concerns or ideas for improvements you have with them. You are the expert when it comes to your job, so your input will be very valuable.

These co-workers will be helping to develop solutions for any hazards found:

_____

_____

_____

_____

Your job may not need to be changed, but if it is, you may also receive training on how best to work with the changes. If for some reason the changes aren't working for you, be sure to let your supervisor or one of the contacts listed above know about it.

Ergonomics Awareness Education

For employees in caution zone jobs and their supervisors

What are WMSDs?

Work-related musculoskeletal disorders, or WMSDs, are injuries to the soft tissues of the body - the muscles, tendons that connect muscles to bones, ligaments that connect bone to bone, nerves, arteries and veins, pretty much every part of your body that's not a bone or internal organ. Pain is the most common symptom of these injuries.

When should I report symptoms?

Of course, it wouldn't make sense to report all the little aches and pains you experience. But how do you know when symptoms are serious enough to need attention? Report your symptoms if:

- pain lasts more than 2 to 3 days in a row, severe or worsening
- pain spreads or "travels" down an arm or leg
- symptoms include numbness or tingling (hands or feet "falling asleep" or feeling of "pins and needles").
- symptoms include feelings of weakness or loss of strength
- symptoms keep you from sleeping at night.
- symptoms get worse while working.

When in doubt, it's better to report symptoms and be told there's nothing wrong than to wait too long.

What parts of the body do WMSDs affect?

WMSDs affect the parts of your body that are prone to injury when demands on them go beyond what they can handle. Typically these injuries occur in the moving parts of the body like your neck, low back, shoulder, elbow, wrist, and knee.

What are some of the symptoms of WMSDs?

WMSDs have many different symptoms, many of which you may have experienced at one time or another. These include:

- Discomfort
- Pain
- Swelling
- Changes in skin color
- Stiffness, tight muscles, or loss of flexibility in a joint.
- Unusual sensations - numbness, tingling, burning, heaviness, "pins and needles," or "falling asleep"- of the hands or feet
- Shooting or stabbing pains in arms or legs.
- Weakness or clumsiness in hands, dropping things.

Having one or more of these symptoms doesn't necessarily mean you have an injury, though.

What are some of the consequences of a WMSD?

Often these injuries start out small, as a little muscle pull or a slightly irritated tendon. It can become aggravated, especially if you keep doing the activity that caused the injury in the first place. The good news is that early treatment is often very simple and successful. Therefore, it's important for your own health to report symptoms as early as you can.

REQUIRED

Ergonomics Awareness Education

For Employees in Caution Zone Jobs and Their Supervisors

Requirements of The Ergonomics Rule

1. Employers are only covered by this rule if they have employees working in "caution zone jobs." Caution zone jobs are typical work activities with exposure to one or more risk factors for work-related musculoskeletal disorders (WMSDs).
2. Employers covered by the rule must provide ergonomics awareness education to all employees who work in caution zone jobs and their supervisors. The video along with these handouts fulfills the requirements.
3. Employers must also work with employees to analyze caution zone jobs to see if the risk factors reach hazard levels.
4. If hazards are found, employers and employees must work together to find solutions to the risk factors, put them in place and check back to make sure they are working. This means, finding ways to reduce employee exposure below hazardous levels or to the degree feasible
5. Some solutions may require training along with their implementation.

A copy of the rule comes with this training information. You can also request a copy of the rule by calling 1-800-4BE-SAFE (1-800-423-7233), or you can download a copy from the website: www.lni.wa.gov/wisha/ergo/

Complying with Washington's Ergonomics Rule:

Ergonomics Awareness Education

Video

Optional handouts

- The Ergonomics rule
- Caution zone jobs checklist
- Hazard zone jobs checklist
- Neutral posture
- Core ergonomics control methods - examples
- Roster sheet - sample
- Certificate of achivement -sample

Department of LABOR AND INDUSTRIES

http://www.lni.wa.gov/wisha

OPTIONAL

Instructor's Guide

Purpose of this video

You may use this videotape and handouts to comply with the awareness education requirements of the Washington state ergonomics rule (WAC 296-62-051). You may read the requirements for employee awareness education in the rule at the end of this guide.

You may also choose to use different materials if you believe that they will be as effective. The Department of Labor and Industries has produced a CD ROM version of slides of this material that, along with some handouts and discussion, can also be used to comply with the rule's requirements.

GETTING READY

Step 1- Resources and Materials you will need:

- A quiet room with basic accomodations for comfort of participants
- A copy of the video
- VHS VCR and TV
- Copies of the handouts
- A copy of the ergonomics rule
- Any props you want to use (for example: tools that the employees use, or a jumper cable clamp to talk about hand force) (optional)
- Cards or certificates to hand out to the class as proof of attendance (optional)
- A training roster to pass around for your records (optional)
- Schedule the class for a date and time convenient to most people. If you want many employees and supervisors to participate, try not to make groups larger than 15 attendees.

Step 2 - Review the materials. Take the time to watch the video and look through the handouts so you will be familiar with them yourself. If you have any questions after looking through these materials, be sure to contact your local L&I office (see page 3) for assistance before you give your first presentation.

Step 3 - Customize the handouts. Some of the handouts, such as the ones on symptoms reporting and employee involvement, should be customized to your organization, with the appropriate contact people listed. If, for example, your safety committee is going to be helping with the ergonomics analysis, then you could inform employees to contact their committee representative with any concerns they have.

OPTIONAL

Step 4 – Show the video

The video is a little over 25 minutes long, which goes a little beyond the average person's attention span for video. It may help to pause the video at certain points for discussion. In the upper right corner of the screen look for pause icons ▮▮ that tell you where it is important to pause and encourage discussion. If any of the risk factors in the video is common in your company, you may want to pause the video just after that risk factor to discuss it further. Here are some guidelines for possible places to pause:

- ▮▮ During the discussion of reporting symptoms early, to tell employees who to report to in your company
- ▮▮ During the discussion of sharing solutions, ask employees if they have any ideas on how to improve their jobs

Step 5 – Answer any questions. Answer any questions the best that you can. Even if you don't have the technical knowledge to answer a lot of questions on ergonomics, you can still answer the important questions about the way that your company will be implementing ergonomics. If any ergonomics questions do come up that you need help answering, get in touch with your local L&I office using the contact information on the following page.

Step 6 - Follow up. Within a week or two of giving the awareness education, take a few minutes to talk to some of the employees and supervisors to make sure they understood what was presented and how it applies to them. Take this opportunity to reinforce the importance of employee involvement in your company's ergonomics efforts.

Getting help

If you have questions while preparing to give this presentation, or if questions come up during the presentation that you need help in answering, use the list below to contact your local L&I office for assistance:

City	Telephone #	E-mail address
Everett	425-290-1382	Claudia Kelley keld235@lni.wa.gov
Seattle	206-515-2837	Mark Soltow solt235@lni.wa.gov
Spokane	509-324-2621	Linda Bronson brol235@lni.wa.gov
Tacoma	253-596-3919	Jerry Hansen hanf235@lni.wa.gov
Tumwater	360-902-5799	Dana Wilcox widn235@lni.wa.gov
Yakima	509-454-3700	Jack Patton patc235@lni.wa.gov

OPTIONAL

Educational Requirements of the Ergonomics Rule

WAC 296-62-05120 Which employees must receive ergonomics awareness education and when?

(1) Employers must ensure that all employees working in or supervising "caution zone jobs" receive ergonomics awareness education at least once every three years. The employer may provide ergonomics awareness education or may rely on education provided by another employer or organization. Ergonomics awareness education materials provided by the Department Of Labor and Industries may be used to meet these requirements.

(2) When employees are assigned to work in or supervise "caution zone jobs," they must receive ergonomics awareness education within 30 calendar days, unless they have received it in the past three years. This requirement applies when the initial "awareness education" deadline in the implementation schedule (WAC 296-62-05160) has passed.

WAC 296-62-05122 What must be included in ergonomics awareness education?

Ergonomics awareness education (for example: Oral presentations, videos, computer-based presentations, or written materials with discussion) must include:

- Information on work-related causes of musculoskeletal disorders, including all caution zone risk factors listed in WAC 296-62-05105 (non-work factors may be included as well);
- The types, symptoms and consequences of WMSDs and the importance of early reporting;
- Information on identifying WMSD hazards and common measures to reduce them; and
- The requirements of the ergonomics rule.

WAC 296-62-051, Ergonomics

Part 1

Part 2

Part 3

Appendices

PART 1

WAC 296-62-05101 What is the purpose of this rule?

The purpose of this rule is to reduce employee exposure to specific workplace hazards that can cause or aggravate work-related musculoskeletal disorders (WMSDs). In workplaces where these hazards exist, employers must reduce them. Doing so will prevent WMSDs such as tendinitis, carpal tunnel syndrome and low back disorders. The rule is not designed to prevent injuries from slips, trips, falls, motor vehicle accidents or being struck by or caught in objects.

This rule contains three parts.

- Part 1, WAC 296-62-05105, provides a quick way for employers to know if they are covered.
- Part 2 requires covered employers to meet an employee-education requirement and identify WMSD hazards. If hazards exist, the employer must reduce them.
- Part 3 shows covered employers when they must comply with this rule. An employer's type of business and number of employees determine how much time is permitted for compliance (3 to 6 years for fixing WMSD hazards).

The rule does not include any requirements for the medical management of WMSDs or change any requirements for handling industrial insurance claims. An employer will not be in violation of this rule solely because an employee develops a WMSD or related symptom.

WAC 296-62-05103 Which employers are covered by this rule?

Employers with "caution zone jobs" are covered by this rule. A "caution zone job" is a job where an employee's typical work activities include any of the specific physical risk factors listed in WAC 296-62-05105.

WAC 296-62-05105 What is a “caution zone job”?

“Caution zone”

A "caution zone job" is a job where an employee's typical work activities include any of the specific physical risk factors listed below. Typical work activities are those that are a regular and foreseeable part of the job and occur on more than one day per week, and more frequently than one week per year.

- Employers having one or more "caution zone jobs" must comply with Part 2 of this rule. “Caution zone jobs” may not be hazardous, but do require further evaluation.
- This rule does not prohibit "caution zone jobs.”
- Employers who have made a reasonable determination that they do not have "caution zone jobs" are not covered by this rule.
- Duration (for example, 2 hours) refers to the total amount of time per day employees are exposed to the risk factor, not how long they spend performing the work activity that includes the risk factor.

Awkward Posture

(1) Working with the hand(s) above the head, or the elbow(s) above the shoulder, more than 2 hours total per day

(2) Working with the neck or back bent more than 30 degrees (without support and without the ability to vary posture) more than 2 hours total per day

(3) Squatting more than 2 hours total per day

(4) Kneeling more than 2 hours total per day

High Hand Force

(5) Pinching an unsupported object(s) weighing 2 or more pounds per hand, or pinching with a force of 4 or more pounds per hand, more than 2 hours total per day (comparable to pinching half a ream of paper)

(6) Gripping an unsupported object(s) weighing 10 or more pounds per hand, or gripping with a force of 10 or more pounds per hand, more than 2 hours total per day (comparable to clamping light duty automotive jumper cables onto a battery)

Highly Repetitive Motion

(7) Repeating the same motion with the neck, shoulders, elbows, wrists, or hands (excluding keying activities) with little or no variation every few seconds more than 2 hours total per day

(8) Performing intensive keying more than 4 hours total per day

Repeated Impact

(9) Using the hand (heel/base of palm) or knee as a hammer more than 10 times per hour more than 2 hours total per day

Heavy, Frequent or Awkward Lifting

(10) Lifting objects weighing more than 75 pounds once per day or more than 55 pounds more than 10 times per day

(11) Lifting objects weighing more than 10 pounds if done more than twice per minute more than 2 hours total per day

(12) Lifting objects weighing more than 25 pounds above the shoulders, below the knees or at arms length more than 25 times per day

Moderate to High Hand-Arm Vibration

(13) Using impact wrenches, carpet strippers, chain saws, percussive tools (jack hammers, scalers, riveting or chipping hammers) or other hand tools that typically have high vibration levels more than 30 minutes total per day

(14) Using grinders, sanders, jig saws or other hand tools that typically have moderate vibration levels more than 2 hours total per day

(Employers may assume that hand tools vibrating less than 2.5 meters per second squared (m/s^2) eight-hour equivalent are not covered.)

PART 2

WAC 296-62-05110 When do employers' existing ergonomics activities comply with this rule?

Employers may continue to use effective alternative methods established before this rule's adoption date. If used, the employer must be able to demonstrate that the alternative methods, taken as a whole, are as effective as the requirements of this rule in reducing the WMSD hazards of each job and providing for employee education, training and participation.

WAC 296-62-05120 Which employees must receive ergonomics awareness education and when?

(1) Employers must ensure that all employees working in or supervising "caution zone jobs" receive ergonomics awareness education at least once every three years. The employer may provide ergonomics awareness education or may rely on education provided by another employer or organization. Ergonomics awareness education materials provided by the department of labor and industries may be used to meet these requirements.

(2) When employees are assigned to work in or supervise "caution zone jobs," they must receive ergonomics awareness education within 30 calendar days, unless they have received it in the past three years. This requirement applies when the initial "awareness education" deadline in the implementation schedule (WAC 296-62-05160) has passed.

WAC 296-62-05122 What must be included in ergonomics awareness education?

Ergonomics awareness education (for example: Oral presentations, videos, computer-based presentations, or written materials with discussion) must include:

- Information on work-related causes of musculoskeletal disorders, including all caution zone risk factors listed in WAC 296-62-05105 (nonwork factors may be included as well);
- The types, symptoms and consequences of WMSDs and the importance of early reporting;
- Information on identifying WMSD hazards and common measures to reduce them; and
- The requirements of this ergonomics rule.

WAC 296-62-05130 What options do employers have for analyzing and reducing WMSD hazards?

All covered employers must determine whether "caution zone jobs" have WMSD hazards and must reduce the WMSD hazards identified as described below.

Employers may choose either the General Performance Approach or the Specific Performance Approach as follows:

WAC 296-62-05130 - Analyzing and reducing WMSD hazards: General Performance Approach	WAC 296-62-05130 - Analyzing and reducing WMSD hazards: Specific Performance Approach
(1) The employer must analyze "caution zone jobs" to identify those with WMSD hazards that must be reduced. A WMSD hazard is a physical risk factor that by itself or in combination with other physical risk factors has a sufficient level of intensity, duration or frequency to cause a substantial risk of WMSDs. The employer must use hazard control levels as effective as the recommended levels in widely used methods such as the Job Strain Index, the lifting guidelines in the Department of Energy ErgoEASER, the ANSI S3.34-1986 (R1997) Hand Arm Vibration Standards, the 1991 NIOSH Lifting Equation, (as described in Waters 1993), the UAW-GM Risk Factor Checklists, applicable ACGIH threshold limit values for physical agents, Rapid Entire Body Assessment (REBA), or Rapid Upper Limb Assessment (RULA).	(1) The employer must analyze "caution zone jobs" to identify those with WMSD hazards that must be reduced. A WMSD hazard is a physical risk factor that exceeds the criteria in Appendix B of this rule.
(2) The employer must analyze "caution zone jobs" using a systematic method that includes the following, if applicable: • Physical demands specific to the worksite including posture, force, repetition, repeated impacts, hand-arm vibration, duration, work pace, task variability and recovery time; • Layout of the work area, including reaches, working heights, seating and surfaces; and • Manual handling requirements, including size, shape, weight, and packaging.	(2) Same as General Performance Approach
(3) Individuals responsible for hazard analysis must know how to use the analysis method effectively and be informed about the requirements of this rule.	(3) Individuals responsible for hazard analysis must know how to use the analysis provided in Appendix B effectively and be informed about the requirements of this rule.
(4) The employer must reduce all WMSD hazards below the criteria chosen in WAC 296-62-05130(1) or to the degree technologically and economically feasible.	(4) The employer must reduce all WMSD hazards below the criteria in Appendix B of this rule or to the degree technologically and economically feasible.

WAC 296-62-05130 –Analyzing and reducing WMSD hazards: General Performance Approach (cont.)	WAC 296-62-05130 - Analyzing and reducing WMSD hazards: Specific Performance Approach (cont.)
(5) Employers must reduce WMSD hazards as described below by: (a) Implementing controls that do not rely primarily on employee behavior to reduce WMSD hazards, such as the following: • Changes to workstations and tools • Reducing the size and weights of loads handled • Process redesign to eliminate unnecessary steps or introduce task variety • Job rotation (b) If employers cannot reduce WMSD hazards below the hazard level using the controls identified above, they must supplement those controls with interim measures that primarily rely on individual work practices or personal protective equipment. Examples of such practices include the following: • Impact gloves • Team lifting • Training on work techniques (c) This rule does not require an employer to control WMSD hazards by replacing full-time employees with part-time employees or otherwise reducing an individual's hours of employment. If an employer has implemented all other technologically and economically feasible controls, and a WMSD hazard remains, the employer will be deemed in compliance with this subsection.	(5) Same as General Performance Approach
(6) If measures to reduce WMSD hazards include changes in the job or work practices then job-specific training must be provided. This job-specific training must include: • The hazards of the work activities; • Safe work practices; and • The proper use and maintenance of specific measures to reduce WMSD hazards that have been implemented.	(6) Same as General Performance Approach
(7) No written ergonomics program is required. The employer must be able to demonstrate the following: • The method used to analyze "caution zone jobs"; • The criteria used to identify WMSD hazards; • The jobs with identified WMSD hazards; and • The reduction of all WMSD hazards below the criteria chosen in WAC 296-62-05130(1) or to the degree technologically and economically feasible.	(7) No written ergonomics program is required. The employer must be able to demonstrate that all WMSD hazards have been reduced below the criteria identified in Appendix B of this rule or to the degree technologically and economically feasible.

WAC 296-62-05140 How must employees be kept involved and informed?

(1) The employer must provide for and encourage employee participation in analyzing "caution zone jobs" and selecting measures to reduce WMSD hazards. Employers with eleven or more employees who are required to have safety committees (WAC 296-24-045) must involve this committee in choosing the methods to be used for employee participation.

(2) Employers with eleven or more employees must share the following information with the safety committee (if a committee is required by WAC 296-24-045). Employers who are not required to have a safety committee (WAC 296-24-045) must provide this information at safety meetings:

- The requirements of this rule;
- Identified "caution zone jobs";
- Results of the hazard analysis and/or identification of jobs with WMSD hazards; and
- Measures to reduce WMSD hazards.

(3) The employer must review its ergonomics activities at least annually for effectiveness and for any needed improvements. This review must include members of the safety committee where one exists or ensure an equally effective means of employee involvement.

WAC 296-62-05150 How are terms and phrases used in this rule?

Note: Check L&I's WISHA Services web site at http://www.lni.wa.gov/wisha/ergo for current links to any of the web sites referred to in this section.

ACGIH threshold limit values for physical hazards - The American Conference of Governmental Industrial Hygienists, Thresholds Limit Values for Chemical Substances and Physical Agents in the Work Environment, and Biological Exposure Indices (TLVs and BEIs). Available for purchase at the ACGIH web site at http://www.acgih.org.

ANSI S3.34-1986 (R1997) Hand Arm Vibration Standards - American National Standard Guide for the Measurement and Evaluation of Human Exposure to Vibration Transmitted to the Hand. ANSI S3.34-1986 (R1997). Available for purchase at the ANSI web site at http://web.ansi.org/default.htm.

"Caution zone jobs" - Jobs where an employee's typical work activities include any of the specific physical risk factors identified in WAC 296-62-05105. These jobs have a sufficient degree of risk to require ergonomics awareness education and job hazard analysis.

Department of Energy ErgoEASER - Ergonomics Education, Awareness, System Evaluation and Recording (ErgoEASER) software package. U. S. Department of Energy, Office of Environment, Safety, and Health (1995). Can be downloaded from the Department of Energy web site at http://tis.eh.doe.gov/others/ergoeaser/download.htm.

Ergonomics – The science and practice of designing jobs or workplaces to match the capabilities and limitations of the human body.

Full Time Equivalent (FTE) – The equivalent of one person working full-time for one year (2,000 worker hours per year). For example, two persons working half time count as one FTE.

WAC 296-62-05150 (Cont.)

High Hand-Arm Vibration Levels - Tools with vibration values equal to or greater than 10 meters per second squared (m/s^2) eight-hour equivalent. Examples include some impact wrenches, carpet strippers, chain saws, and percussive tools.

Intensive Keying – Keying with the hands or fingers in a rapid, steady motion with few opportunities for temporary work pauses.

Job Strain Index - The Strain Index: A proposed method to analyze jobs for risk of distal upper extremity disorders, Moore, J.S., and A. Garg, (1995). Published in American Industrial Hygiene Association Journal, volume 56, pages 443-458.Web site at http://sg-www.satx.disa.mil/hscoemo/tools/strain.htm.

Moderate Hand-Arm Vibration Levels – Tools with vibration values between 2.5 and 10 meters per second squared (m/s^2) eight-hour equivalent. Examples include some grinders, sanders, and jig saws.

NIOSH Lifting Equation, 1991 – Waters, T.R., Putz-Anderson, V., Garg, A., and Fine, L.J. (1993). Revised NIOSH equation for the design and evaluation of manual lifting tasks. Published in Ergonomics, volume 36 (7), pages 749-776. For a manual on using the lifting equation see: Applications Manual for Revised Lifting Equation, Waters, T., Putz-Anderson, V., Garg, A. (1994). Available from the National Technical Information Center (NTIS), Springfield, VA 22161. 1-800-553-6847.
Calculator web site at http://www.industrialhygiene.com/calc/lift.html.
Application guideline web site at http://www.cdc.gov/niosh/94-110.html.

Rapid Entire Body Assessment tool (REBA) - Hignett, S. and McAtamney, L. (2000) Rapid entire body assessment (REBA). Published in Applied Ergonomics volume 31, pages 201-205.

Recovery Time – Work periods with light task demands, or rest breaks, that permit an employee to recover from physically demanding work.

The Rapid Upper Limb Assessment (RULA) - McAtamney, L. and Corlett, E.N. (1993) RULA: A survey method for the investigation of work-related upper limb disorders. Published in Applied Ergonomics, volume 24 (2), pages 91-99.

UAW-GM Risk Factor Checklists - UAW-GM Risk Factor Checklist 2, 1998. UAW-GM (United Auto Workers-General Motors), Center for Human Resources, Health and Safety Center, 1030 Doris Road, Auburn Hills, Michigan.

Work Activities – The physical demands, exertions, or functions of the job or task.

Work-Related Musculoskeletal Disorders (WMSDs) – Work-related disorders that involve soft tissues such as muscles, tendons, ligaments, joints, blood vessels and nerves. Examples include: Muscle strains and tears, ligament sprains, joint and tendon inflammation, pinched nerves, degeneration of spinal discs, carpal tunnel syndrome, tendinitis, rotator cuff syndrome. For purposes of this rule WMSDs do not include injuries from slips, trips, falls, motor vehicle accidents or being struck by or caught in objects.

PART 3

WAC 296-62-05160 When must employers comply with this rule?

Employers covered by this rule must comply with its requirements by the dates shown.

INITIAL IMPLEMENTATION SCHEDULE		
Employer	**Awareness Education Completed And Hazard Analysis Completed**	**Hazard Reduction Completed**
• All employers in SIC codes* 078, 152, 174, 175, 176, 177, 242, 421, 451, 541, 805, and 836 who employ 50 or more annual full time equivalents (FTEs) in Washington state • The Washington State Department of Labor & Industries	July 1, 2002	July 1, 2003
• The remaining employers in SIC codes* 078, 152, 174, 175, 176, 177, 242, 421, 451, 541, 805 and 836 • All other employers who employ 50 or more annual full time equivalents (FTEs) in Washington state	July 1, 2003	July 1, 2004
All other employers employing 11-49 annual full time equivalents (FTEs) in Washington state	July 1, 2004	July 1, 2005
All other employers employing 10 or fewer annual full time equivalents (FTEs) in Washington state	July 1, 2005	July 1, 2006
SUPPLEMENTAL IMPLEMENTATION SCHEDULE		
New workplaces or businesses	One year from the date the new workplace or business is established OR According to the schedule above	15 months from the date the new workplace or business is established OR According to the schedule above
Significant changes to existing workplaces or businesses	2 months after significant changes occur OR According to the schedule above	3 months after significant changes occur OR According to the schedule above

**Note: SIC code is the employer's primary SIC based on hours of employment. See Appendix C of this rule for descriptions of these SIC codes.*

Note: Help for employers in implementing the rule.

(1) Developing Ergonomics Guides and Models

The department will work with employer and employee organizations to develop guides for complying with this rule (for example, a model program for ergonomics awareness education). Employer use of these guides will be optional.

(2) Identifying Industry "Best Practices"

The department will work with employer and employee organizations to develop or identify methods of reducing WMSD hazards that will serve as examples of industry-specific "best practices." As industry-specific "best practices" are developed, they may be used to demonstrate employer compliance with the requirement to reduce WMSD hazards. Employers will not be restricted to the use of industry "best practices" for compliance.

(3) Establishing Inspection Policies and Procedures

The department will develop policies and procedures for inspections and enforcement of this rule before the rule is enforced. These policies and procedures will be communicated to employers and employees through mailing lists, business associations, labor unions and other methods before the department issues any citations or penalties.

(4) Conducting Demonstration Projects

Following adoption of this rule, the department will work with employers and employees to undertake demonstration projects to test and improve guidelines, "best practices" and inspection policies and procedures as they are developed.

(5) Providing Information on Ergonomics

The department will work with employer and employee organizations to collect and share the most effective examples of ergonomics training, job analysis, and specific solutions to problems. The department will make special efforts to share this information with the small business community

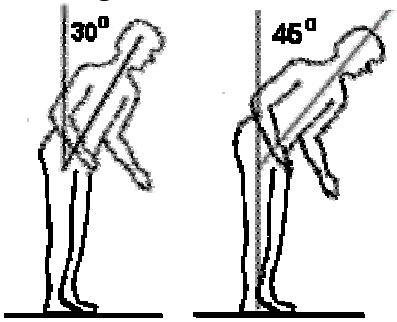
WAC 296-62-05172 Appendix A: Illustrations of physical risk factors

The following illustrations are provided as reference only. Some users of this rule may find the pictures aid their understanding of the text in WAC 296-62-05105.

Awkward Postures

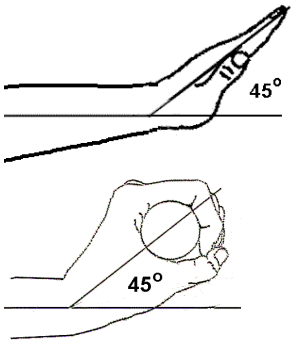
Raising the hands above the head

Bending the back

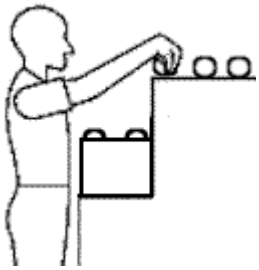


Bending the wrist

Extension

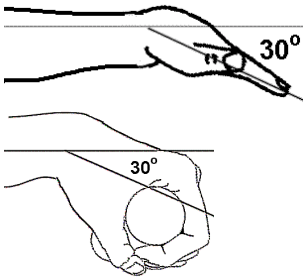


Raising the elbows above the shoulders

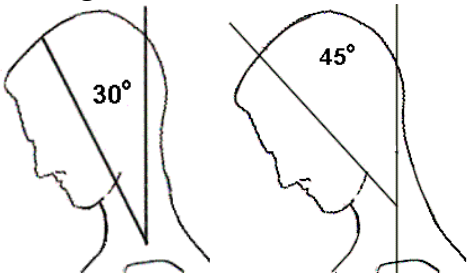


Squatting

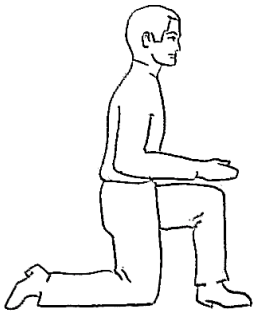
Flexion



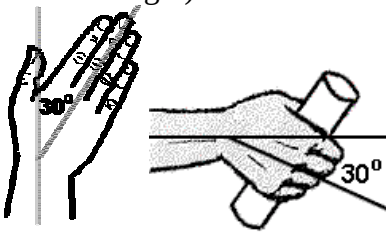
Bending the neck



Kneeling

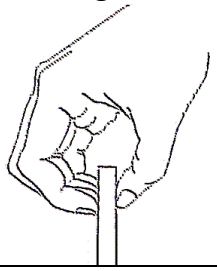


Ulnar deviation (bent towards the little finger)

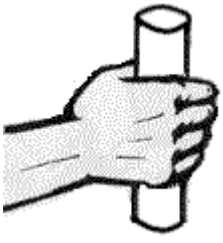


High Hand Force

Pinching 2 lbs.

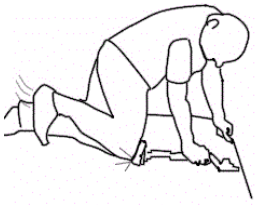


Gripping 10 lbs.

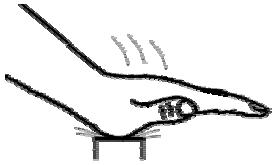


Repeated Impacts

Using the knee as a hammer

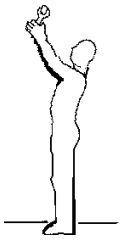
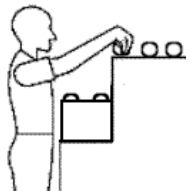
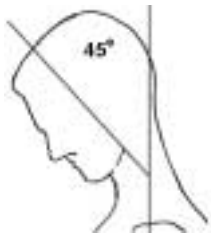
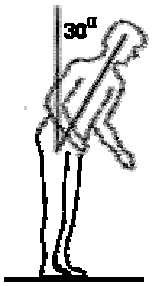
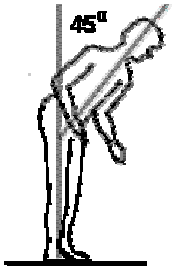


Using the hand as a hammer



WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

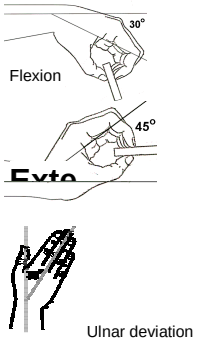
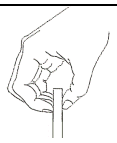
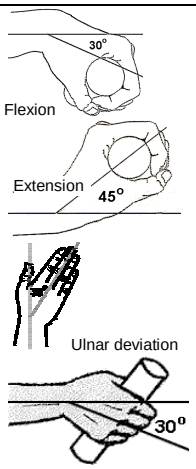
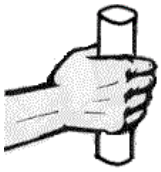
For each "caution zone job" find any physical risk factors that apply. Reading across the page, determine if all of the conditions are present in the work activities. If they are, a WMSD hazard exists and must be reduced below the hazard level or to the degree technologically and economically feasible (see WAC 296-62-05130(4), specific performance approach).

Awkward Posture				Check (✓) here if this is a WMSD hazard
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	
Shoulders	Working with the hand(s) above the head or the elbow(s) above the shoulder(s)	More than 4 hours total per day		❑
	Repetitively raising the hand(s) above the head or the elbow(s) above the shoulder(s) more than once per minute	More than 4 hours total per day		❑
Neck	Working with the neck bent more than 45º (without support or the ability to vary posture)	More than 4 hours total per day		❑
Back	Working with the back bent forward more than 30º (without support, or the ability to vary posture)	More than 4 hours total per day		❑
	Working with the back bent forward more than 45º (without support or the ability to vary posture)	More than 2 hours total per day		❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

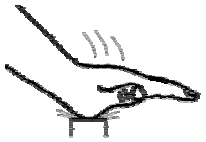
Awkward Posture (continued)				Check (✓) here if this is a WMSD hazard
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	
Knees	Squatting	More than 4 hours total per day		❑
	Kneeling	More than 4 hours total per day		❑ ❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

High Hand Force					
Body Part	**Physical Risk Factor**	**Combined with**	**Duration**	**Visual Aid**	Check (✓) here if this is a WMSD hazard
Arms, wrists, hands	Pinching an unsupported object(s) weighing 2 or more pounds per hand, or pinching with a force of 4 or more pounds per hand (comparable to pinching half a ream of paper)	Highly repetitive motion	More than 3 hours total per day		❑
		Wrists bent in flexion 30° or more, or in extension 45° or more, or in ulnar deviation 30° or more	More than 3 hours total per day		❑
		No other risk factors	More than 4 hours total per day		❑
Arms, wrists, hands	Gripping an unsupported object(s) weighing 10 or more pounds per hand, or gripping with a force of 10 pounds or more per hand (comparable to clamping light duty automotive jumper cables onto a battery)	Highly repetitive motion	More than 3 hours total per day		❑
		Wrists bent in flexion 30° or more, or in extension 45° or more, or in ulnar deviation 30° or more	More than 3 hours total per day		❑
		No other risk factors	More than 4 hours total per day		❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

Highly Repetitive Motion				
Body Part	**Physical Risk Factor**	**Combined with**	**Duration**	Check (✓) here if this is a WMSD hazard
Neck, shoulders, elbows, wrists, hands	Using the same motion with little or no variation every few seconds (excluding keying activities)	No other risk factors	More than 6 hours total per day	❑
	Using the same motion with little or no variation every few seconds (excluding keying activities)	Wrists bent in flexion 30° or more, or in extension 45° or more, or in ulnar deviation 30° or more **AND** High, forceful exertions with the hand(s)	More than 2 hours total per day	❑
	Intensive keying	Awkward posture, including wrists bent in flexion 30° or more, or in extension 45° or more, or in ulnar deviation 30° or more	More than 4 hours total per day	❑
		No other risk factors	More than 7 hours total per day	❑

Repeated Impact				
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	Check (✓) here if this is a WMSD hazard
Hands	Using the hand (heel/base of palm) as a hammer more than once per minute	More than 2 hours total per day		❑
Knees	Using the knee as a hammer more than once per minute	More than 2 hours total per day		❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

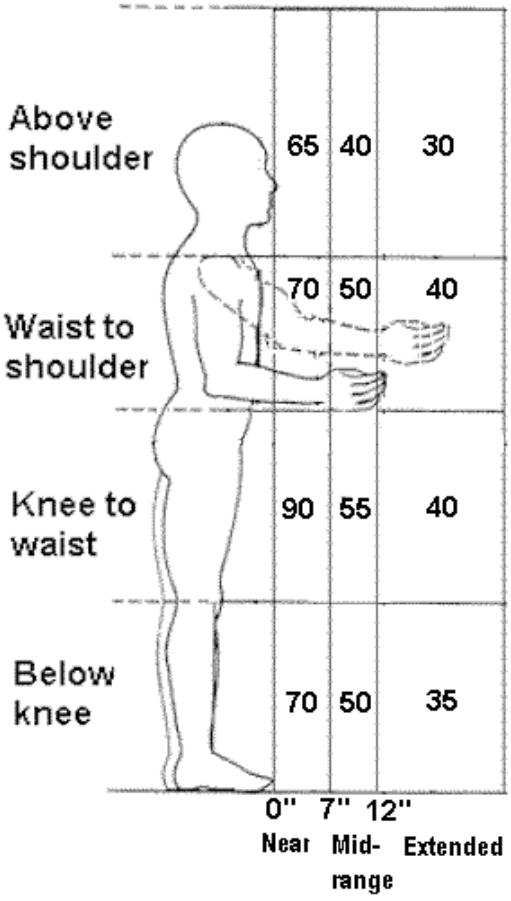
Heavy, Frequent or Awkward Lifting

This analysis only pertains if you have "caution zone jobs" where employees lift 10 lbs. or more (see WAC 296-62-05105, Heavy, Frequent, or Awkward Lifting) and you have chosen the specific performance approach.

Step 1 **Find out the actual weight of objects that the employee lifts.**

Actual Weight = _____ lbs.

Step 2 **Determine the Unadjusted Weight Limit.** Where are the employee's hands when they begin to lift or lower the object? Mark that spot on the diagram below. The number in that box is the Unadjusted Weight Limit in pounds.



Unadjusted Weight Limit: _____ lbs.

Step 3 **Find the Limit Reduction Modifier.** Find out how many times the employee lifts per minute and the total number of hours per day spent lifting. Use this information to look up the Limit Reduction Modifier in the table below.

How many lifts per minute?	For how many hours per day?		
	1 hr or less	1 hr to 2 hrs	2 hrs or more
1 lift every 2-5 mins.	1.0	0.95	0.85
1 lift every min	0.95	0.9	0.75
2-3 lifts every min	0.9	0.85	0.65
4-5 lifts every min	0.85	0.7	0.45
6-7 lifts every min	0.75	0.5	0.25
8-9 lifts every min	0.6	0.35	0.15
10+ lifts every min	0.3	0.2	0.0

Note: For lifting done less than once every five minutes, use 1.0

Limit Reduction Modifier: ____._____

Step 4 **Calculate the Weight Limit.** Start by copying the Unadjusted Weight Limit from Step 2.

Unadjusted Weight Limit: = _____ lbs.

If the employee twists more than 45 degrees while lifting, reduce the Unadjusted Weight Limit by multiplying by 0.85. Otherwise, use the Unadjusted Weight Limit

Twisting Adjustment: = _____.____

Adjusted Weight Limit: = _____ lbs.

Multiply the Adjusted Weight Limit by the Limit Reduction Modifier from Step 3 to get the Weight Limit. **X**

Limit Reduction Modifier: _____.___

Weight Limit: = _____ lbs.

Step 5 **Is this a hazard?** Compare the Weight Limit calculated in Step 4 with the Actual Weight lifted from Step 1. If the Actual Weight lifted is greater than the Weight Limit calculated, then the lifting is a WMSD hazard and must be reduced below the hazard level or to the degree technologically and economically feasible.

Note: If the job involves lifts of objects with a number of different weights and/or from a number of different locations, use Steps 1 through 5 above to:

1. Analyze the two worst case lifts -- the heaviest object lifted and the lift done in the most awkward posture.
2. Analyze the most commonly performed lift. In Step 3, use the frequency and duration for <u>all</u> of the lifting done in a typical workday.

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

Hand-Arm Vibration

Use the instructions below to determine if a hand-arm vibration hazard exists.

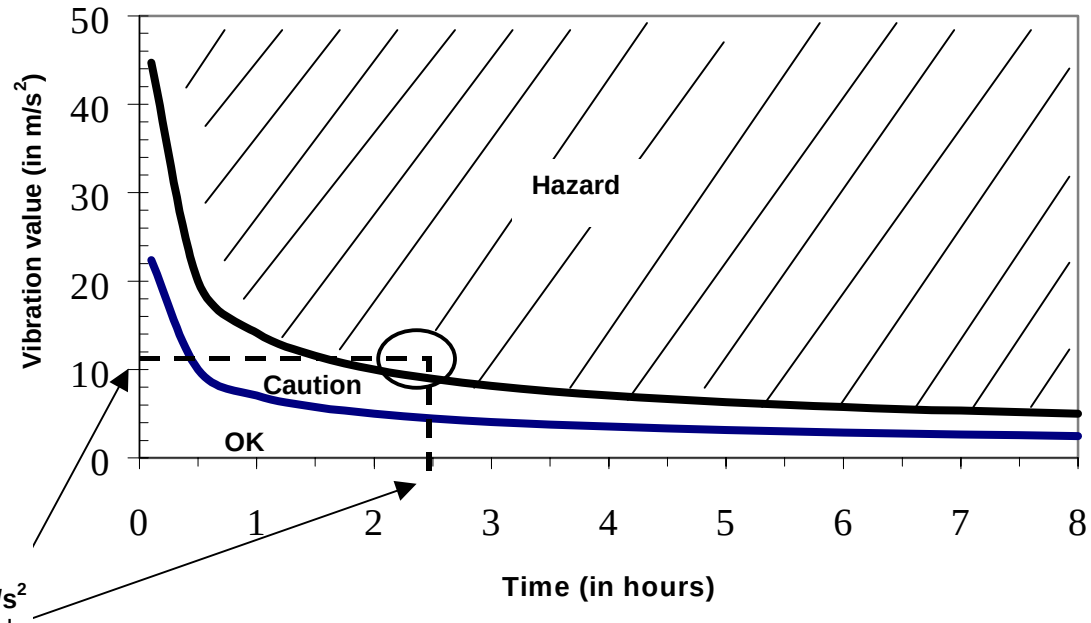
Step 1. Find the vibration value for the tool. (Get it from the manufacturer, look it up at this web site: http://umetech.niwl.se/vibration/HAVHome.html, or you may measure the vibration yourself). The vibration value will be in units of meters per second squared (m/s^2). On the graph below find the point on the left side that is equal to the vibration value.

Note: You can also link to this web site through the L&I WISHA Services Ergonomics web site: http://www.lni.wa.gov/wisha/ergo

Step 2. Find out how many total hours per day the employee is using the tool and find that point on the bottom of the graph.

Step 3. Trace a line in from each of these two points until they cross.

Step 4. If that point lies in the crosshatched "Hazard" area above the upper curve, then the vibration hazard must be reduced below the hazard level or to the degree technologically and economically feasible. If the point lies between the two curves in the "Caution" area, then the job remains as a "Caution Zone Job." If it falls in the "OK" area below the bottom curve, then no further steps are required.



Example:
An impact wrench with a **vibration value of 12 m/s^2** is used for **2½ hours** total per day. The exposure level is in the Hazard area. The vibration must be reduced below the hazard level or to the degree technologically and economically feasible.

Note: The caution limit curve (bottom) is based on an 8-hour energy-equivalent frequency-weighted acceleration value of 2.5 m/s^2. The hazard limit curve (top) is based on an 8-hour energy-equivalent frequency- weighted acceleration value of 5 m/s^2.

WAC 296-62-05176 Appendix C: Standard Industry Classification (SIC) codes.

The descriptive titles for the SIC codes listed in the implementation schedule (WAC 296-62-05160) are provided below. SIC codes are established by the federal Office of Management and Budget and are listed in the Standard Industrial Classification Manual, 1987 edition.

SIC*	INDUSTRY	EXAMPLES
078	Landscape and Horticultural Services	• lawn and garden services • ornamental shrub and tree services
152	General Building Contractors, Residential Buildings	• general contractors single family houses • general contractors residential buildings other than single family
174	Masonry, Stonework, Tile Setting & Plastering	• masonry, stone setting, and other stone work • plastering, drywall, acoustical, and insulation work • terrazzo, tile, marble, and mosaic work
175	Carpentry and Floor Work	• carpentry work • floor laying and other floor work (NEC**)
176	Roofing, Siding and Sheet Metal	• installation of roofing, siding, and sheet metal work
177	Concrete Work	• includes portland cement and asphalt
242	Sawmills & Planing Mills	• sawmills and planing mills • hardwood dimension and flooring mills • special products sawmills (NEC**)
421	Trucking & Courier Service, not air	• trucking • local trucking with or without storage • courier services (except by air)
451	Air Transportation, Scheduled and Air Courier	• scheduled air transportation • air courier services Note: WISHA jurisdiction excludes planes in flight.
541	Grocery Stores	• supermarkets • food stores • grocery stores
805	Nursing & Personal Care	• skilled nursing care facilities • intermediate care facilities • nursing and personal care facilities, (NEC**)
836	Residential Care	• establishments primarily engaged in the provision of residential social and personal care for children, the aged, and special categories of persons with some limits on ability for self-care, but where medical care is not a major element.

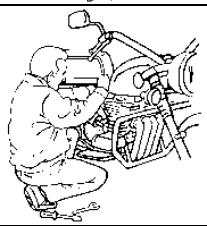
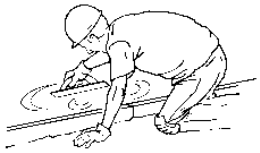
*SIC or NAICS equivalent. In 2000, federal agencies that produce statistical data will adopt NAICS (North American Industry Classification System) codes and begin to phase out the SIC codes. State and local government agencies also will use this new coding structure to promote a common language for categorizing today's industries.

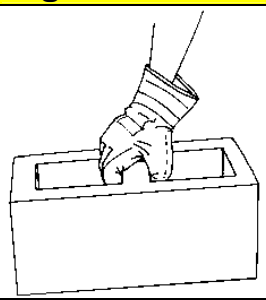
**NEC – not elsewhere classified

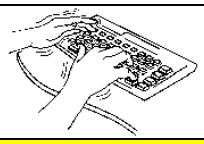
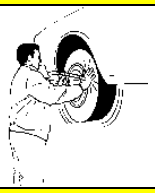
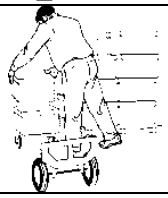
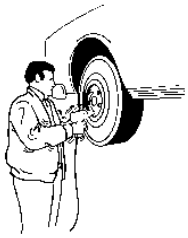
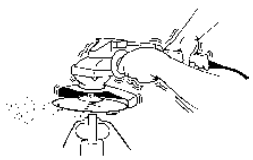
Caution Zone Checklist (WAC 296-62-05105)

Use one sheet for each position evaluated.

Movements or postures that are a regular and foreseeable part of the job, occurring more than one day per week, and more frequently than one week per year.	If done in this job position ✓ the box	Job Position evaluated: Date:	No. of employees in these jobs?

Awkward Posture		Comments/Observations
	**1.** Working with the hand(s) above the head, or the elbow(s) above the shoulders more than 2 hours total per day. ☐	
	**2.** Working with the neck or back bent more than 30 degrees (without support and without the ability to vary posture) more than 2 hours total per day. ☐	
	**3.** Squatting more than 2 hours total per day. ☐	
	**4.** Kneeling more than 2 hours total per day. ☐	

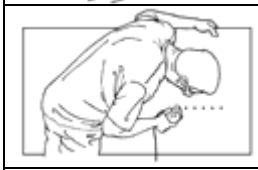
High Hand Force		Comments/Observations
	**5.** Pinching an unsupported object(s) weighing 2 or more pounds per hand, or pinching with a force of 4 or more pounds per hand, more than 2 hours total per day (comparable to pinching half a ream of paper). ☐	
	**6.** Gripping an unsupported objects(s) weighing 10 or more pounds per hand, or gripping with a force of 10 or more pounds per hand, more than 2 hours total per day (comparable to clamping light duty automotive jumper cables onto a battery). ☐	

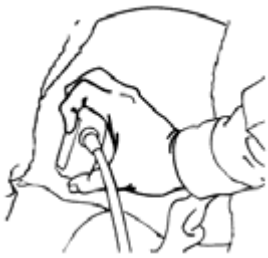
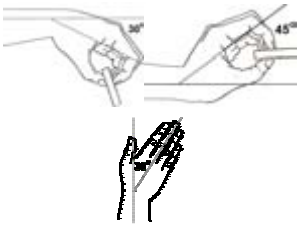
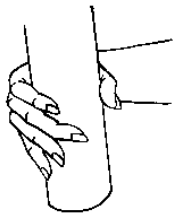
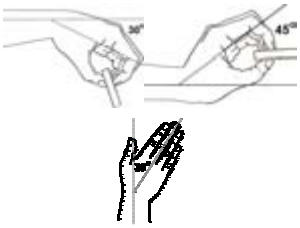
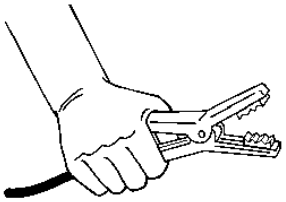
Highly Repetitive Motion		Comments/Observations
	**7.** Repeating the same motion with the neck, shoulders, elbows, wrists, or hands (excluding keying activities) with little or no variation every few seconds, more than 2 hours total per day. ☐	
	**8.** Performing intensive keying more than 4 hours total per day. ☐	
Repeated Impact		**Comments/Observations**
	**9.** Using the hand (heel/base of palm) or knee as a hammer more than 10 times per hour, more than 2 hours total per day. ☐	
Heavy, Frequent or Awkward Lifting (A simple scale can be used to determine the weight of materials)		**Comments/Observations**
	**10.** Lifting object weighing more than 75 pounds once per day or more than 55 pounds more than 10 times per day. ☐	
	**11.** Lifting objects weighing more than 10 pounds if done more than twice per minute, more than 2 hours total per day. ☐	
	**12.** Lifting objects weighing more than 25 pounds above the shoulders, below the knees or at arms length more than 25 times per day. ☐	
Moderate to High Hand- Arm Vibration (Closely estimate or obtain the vibration value of the tool in use)		**Comments/Observations**
	**13.** Using impact wrenches, carpet strippers, chain saws, percussive tools (jack hammers, scalers, riveting or chipping hammers) or other tools that typically have high vibration levels, more than 30 minutes total per day. ☐	
	**14.** Using grinders, sanders, jigsaws or other hand tools that typically have moderate vibration levels more than 2 hours total per day. ☐	

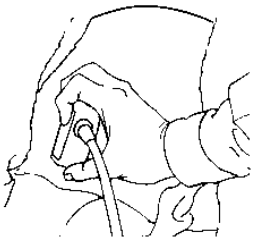
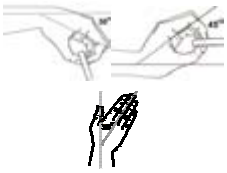
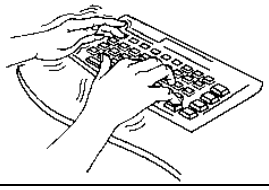
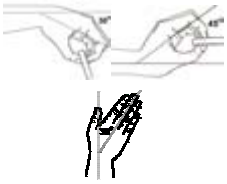
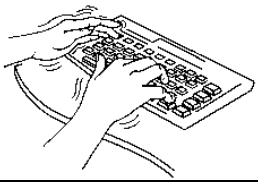
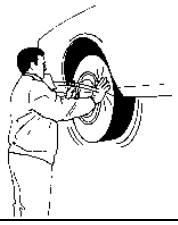
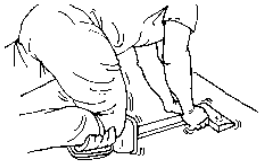
HAZARD ZONE CHECKLIST (APPENDIX B) - WAC 296-62-05174

For each "caution zone job" find any physical risk factors that apply. If a hazard exists, it must be reduced below the hazard level or to the degree technologically and economically feasible.

Movements or postures that are a regular and forseeable part of the job, occurring more than *one day per week*, and more frequently than *one week per year.*	**Hazard Exists** ✓	**Job Position evaluated:** **Date:**	**No. of employees in these jobs?**

Awkward Posture				**Comments/Observations**
	**1.** Working with the hand(s) above the head, or the elbows above the shoulders	More than ***4 hours total*** per day	☐	
	**2.** Repeatedly raising the hand(s) above the head, or the elbow(s) above the shouder(s) more than once per minute	More than ***4 hours total*** per day	☐	
	**3.** Working with the neck bent more than 45° (without support or the ability to vary posture)	More than ***4 hours total*** per day	☐	
	**4.** Working with the back bent forward more than 30° (without support or the ability to vary posture)	More than ***4 hours total*** per day	☐	
	**5.** Working with the back bent forward more than 45° (without support or the ability to vary posture)	More than ***2 hours total*** per day	☐	
	**6.** Squatting	More than ***4 hours total*** per day	☐	
	**7.** Kneeling	More than ***4 hours total*** per day	☐	

High Hand Force			Hazard Exists ✓	Comments/Observations
Pinching an unsupported object(s) weighing 2 lbs or more per hand, or pinching with a force of 4 lbs or more per hand (comparable to pinching a half a ream of paper)				
8. 	+ Highly repetitive motion	+ More than ***3 hours total*** per day	☐	
9. 	+ 	+ More than ***3 hours total*** per day	☐	
10. 	No other risk factors	+ More than ***4 hours total*** per day	☐	
Gripping an unsupported object(s) weighing 10 lbs or more per hand, or gripping with a force of 10 lbs or more per hand (comparable to clamping light duty automotive jumper cables onto a battery)				
11. 	+ Highly Repetitive motion	+ More than ***3 hours total*** per day	☐	
12. 	+ 	+ More than ***3 hours total*** per day	☐	
13. 	No other risk factors	+ More than ***4 hours total*** per day	☐	

Highly Repetitive Motion	Hazard Exists ✓	Comments/ Observations
Using the same motion with little or no variation every few seconds (excluding keying activities)		
14.  +  + High, forceful exertions with the hand(s)	+ More than ***2 hours total*** per day	☐	
15.  No other risk factors	+ More than ***6 hours total*** per day	☐	
Intensive keying		
16.  + 	+ More than ***4 hours total*** per day	☐	
17.  No other risk factors	+ More than ***7 hours total*** per day	☐	
Repeated Impact		**Comments/ Observations**
18.  Using the hand (heel/base of palm) as a hammer more than once per minute	+ More than ***2 hours total*** per day	☐	
19.  Using the knee as a hammer more than once per minute	+ More than ***2 hours total*** per day	☐	

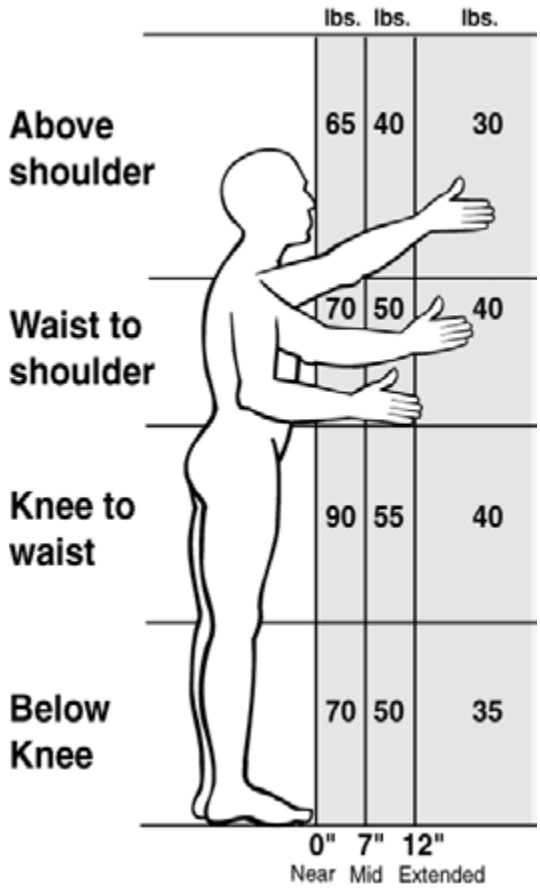
Appendix B: Calculator for analyzing lifting operations

Company		**Evaluator**	
Job		**Date**	

1 **Enter the weight of the object lifted.**

Weight Lifted
Lb.

2 **Circle the number on a rectangle below that corresponds to the position of the person's hands when they begin to lift or lower the objects.**



Department of LABOR AND INDUSTRIES

3 **Circle the number that corresponds to the times the person lifts per minute and the total number of hours per day spent lifting.**

Note: For lifting done less than once every five minutes, use **1.0**

How many lifts per minute?	How many hours per day?		
	1 hr or less	1 hr to 2 hrs	2 hrs or more
1 lift every 2-5 min	1.0	0.95	0.85
1 lift every min	0.95	0.9	0.75
2-3 lifts every min	0.9	0.85	0.65
4-5 lifts every min	0.85	0.7	0.45
6-7 lifts every min	0.75	0.5	0.25
8-9 lifts every min	0.6	0.35	0.15
10+ lifts every min	0.3	0.2	0.0

4 **Circle 0.85 if the person twists 45 degrees or more while lifting.** 0.85

Otherwise circle 1.0

5 **Copy below the numbers you have circled in steps 2, 3, and 4.**

lb. (Step 2)	X	(Step 3)	X	(Step 4)	=	Lifting Limit
						lb.

6 **Is the Weight Lifted (1) less than the lifting Limit (5)?**

Yes – OK
No – HAZARD
See back for solution ideas.

Note: If the job involves lifts of objects with a number of different weights and/or from a number of different locations, use Steps 1 through 5 above to:
1. Analyze the two worst case lifts -- the heaviest object lifted and the lift done in the most awkward posture.
2. Analyze the most commonly performed lift. In Step 3, use the frequency and duration for all of the lifting done in a typical workday.

Appendix B: Calculator for analyzing lifting operations

7 SOLUTIONS PRINCIPLES

To find the most appropriate solution for this job, look for the lowest number you used to do the calculations (2, 3, 4)

HANDS POSITION (2) • Reduce the horizontal distance from the body • Remove barriers, obstacles • Reduce weight of load • Reduce capacity of the container • Team lift the object with two or more workers • Design workstation with the adjustable heights to eliminate trunk bent forward • Provide handholds • Store objects at 30 inches off the floor	**FREQUENCY (3)** • Increase weight of a load so it requires mechanical assist • Improve layout to minimize manual material handling • Use mobile storage racks
DURATION (3) • Use mechanical assist such as overhead hoist, manipulator, vacuum lift, pneumatic balancer, forklift • Eliminate the use of deep shelves • Job rotation to other jobs where no lifting is required	**TWISTING (4)** • Redesign workstation layout to eliminate trunk twisting • Locate lifting operations in front of the body • Use slides, gravity, chutes to eliminate lifting/twisting

Appendix B: Calculator for Hand-Arm Vibration

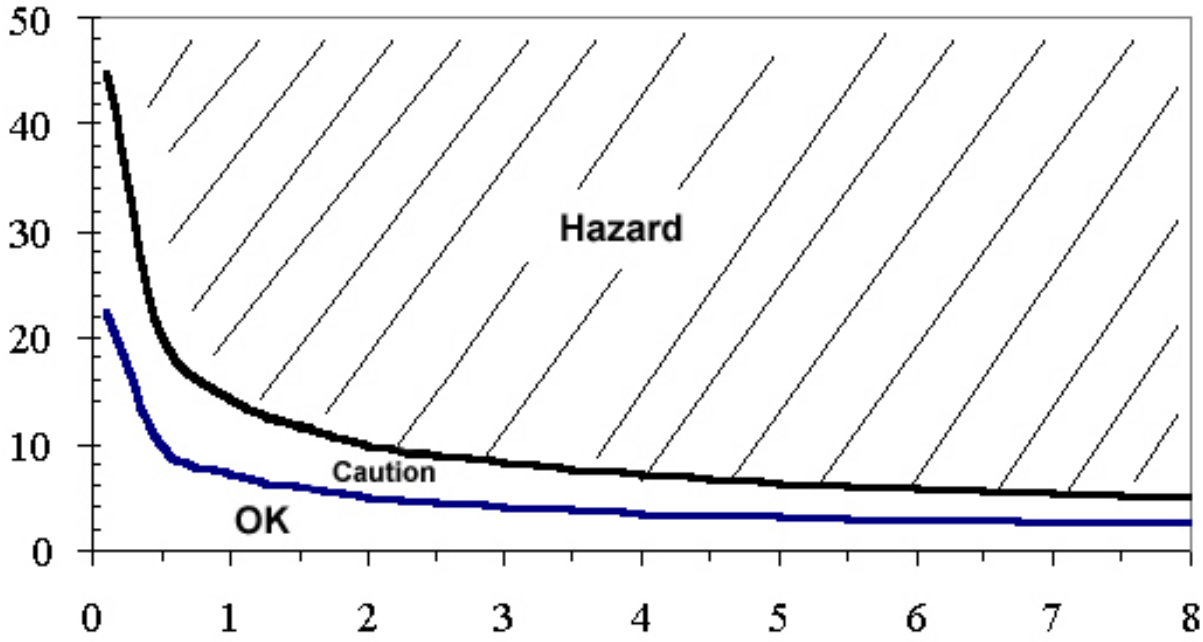
1. Find the vibration value for the tool. (Get it from the manufacturer look it up at this website http://umetech.niwl.se/Vibration/ On the graph below mark the point on the left side shown as Vibration value.

Vibration
m/s^2

2. Find out how many total hours per day the employee is using the tool and mark that point on the bottom of the chart below.

Duration
Hrs.

3. Trace a line into the graph from each of these two points until they cross.



4. Interpretation

a. If that point lies in the crosshatched "Hazard" area above the upper curve, then the vibration hazard must be reduced below the hazard level or to the degree technologically and economically feasible.
b. If the point lies between the two curves in the "Caution" area, then the job remains as a "Caution Zone Job."
c. If the point falls in the "OK" area below the bottom curve, then no further steps are required.

Note: The caution limit curve (bottom) is based on an 8-hour energy-equivalent frequency- weighted acceleration value of 2.5 m/s^2. The hazard limit curve (top) is based on an 8-hour energy-equivalent frequency- weighted acceleration value of 5 m/s^2.

OPTIONAL

Ergonomics Awareness Education

For Employees in Caution Zone Jobs and Their Supervisors

Neutral Posture

A good posture is one that places the least amount of stress on your joints and muscles, allowing them to work more efficiently. This is referred to as neutral posture.

Whether you are standing or sitting, you should try to work in a neutral posture as much as possible. Here are some guidelines:

- Keep all the parts of your body aligned – ears directly over shoulders, shoulders over hips, hips over knees, knees over ankles.
- Look straight ahead with your head level, not twisted or bent.
- Relax your shoulders; don't hunch them or rotate them forward.
- Let your upper arms and elbows lie comfortably at your sides.
- Keep your wrists straight and in a handshake position.
- Stand with your legs straight, but with your knees relaxed, not locked back.

Seated neutral posture is the same as standing, with two more things to keep in mind:

- Support your low back using the chair's backrest.
- Support your feet by placing them flat on the floor or on a footrest, with your knees slightly lower than your hips.

While neutral posture places the least stress on your body, it wouldn't be good for you to stay in that position all day. Your body was designed to move around and is much happier when it is active.

Hazard	Ergonomic Control Methods

Table 10 Core Ergonomic Control Methods - Examples

Hazard	Ergonomic Control Methods
AWKWARD POSTURES	
Working with hand(s) above the head or the elbow(s) above the shoulder(s), more than 4 hours total per day	• Raise the worker up with elevated work platforms or ladders • Make tools longer with articulating arms or extension handles • Bring the work down and tilt it on its side for better access • Provide adjustability where possible for multiple users • Design reach distance for the shortest worker • Provide arm supports • Use sloping platforms with overhead conveyers to adjust for variable worker heights
Repetitively raising the hand(s) above the head or the elbow(s) above the shoulder(s) more than once per minute, more than 4 hours total per day	• Limit overhead storage to infrequently used items • Raise the worker up with elevated work platforms or ladders • Make tools longer with articulating arms or extension handles • Bring the work down and tilt it on its side for better access • Provide adjustability where possible for multiple users • Design reach distance for the shortest worker
Working with the neck bent more than 45°(without support or the ability to vary posture), more than 4 hours total per day	• Raise and tilt objects being viewed to keep neck more upright • Use magnifiers when working on objects with the hands in order to keep the arms and shoulders down • Support the head with a chin/forehead cradle. • Use monitor arms or stackers to raise up monitors • Use video or mirror systems to view objects or locations that are difficult to see (dental/medical/surgical tasks, fork trucks)

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
Working with the back bent forward (without support or the ability to vary posture) more than 30 degrees for more than 4 hours per day, or more than 45° for more than 2 hours per day	• Raise and tilt the work to provide better access • Use a sit/stand stool to lower the worker • Make tools longer with articulating arms or extension handles • Alternate between bending, sitting, kneeling and squatting • Use a chest pad to support the weight of the upper body • Locate objects well within arms' reach • Use body carts for ground level work
Squatting more than 4 hours total per day	• Raise the work to provide better access • Make tools longer with articulating arms or extension handles • Alternate between bending, sitting, kneeling and squatting • Use body carts for ground level work • Use short portable stools for ground level work
Kneeling more than 4 hours total per day	• Wear knee pads • Raise the work to provide better access • Make tools longer with articulating arms or extension handles • Alternate between bending, sitting, kneeling and squatting

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
HIGH HAND FORCE	
Pinching an unsupported object(s) weighing 2 or more lbs. per hand or pinching with a force of 4 or more pounds per hand, combined with highly repetitive motions for more than 3 hours total per day	• Redesign hand-tool interface for use of a power grip • Reduce weight of tool or object • Use clamps or vices to eliminate forceful pressing or pinches • Use fasteners requiring minimal pinch force (e.g. plastic rather than metal) • Use fasteners that can be inserted by tool
Pinching an unsupported object(s) weighing 2 or more lbs. per hand or pinching with a force of 4 or more pounds per hand, combined with wrists bent in flexion 30^{o} or more or in extension 45^{o} or more for more than 3 hours total per day	• Redesign hand-tool interface for use of a power grip • Reduce hand-object interface to reduce slipperiness • Reduce weight of tool or object • Change tool, work surface orientation, or worker location to reduce bent wrist postures
Pinching an unsupported object(s) weighing 2 or more lbs. per hand or pinching with a force of 4 or more pounds per hand for more than 4 hours total per day	• Redesign hand-tool interface for use of a power grip • Reduce weight of tool or object • Rotate jobs between workers • Use clamps or vices to eliminate forceful pressing or pinches • Use fasteners requiring minimal pinch force (e.g. plastic rather than metal) • Use fasteners that can be inserted by tool
Gripping an unsupported object(s) weighing 10 or more lbs. per hand or gripping with a force of 10 or more pounds per hand, combined with highly repetitive motions for more than 3 hours total per day	• Reduce weight of tool or object. • Use balancers, adjustable fixtures, articulating arms to hold handled items or minimize weight held in the hand • Use two hands rather than one • Alternate between hands • Sharpen cutting tools to reduce force requirements during use • Rotate between tasks

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
Gripping an unsupported object(s) weighing 10 or more lbs. per hand or gripping with a force of 10 or more pounds per hand, combined with wrists bent in flexion 30° or more or in extension 45° or more or in ulnar deviation 30° or more for more than 3 hours total per day	• Reduce weight of tool or object. • Change tool, work surface orientation, or worker location to reduce bent wrist postures • Use balancers, adjustable fixtures, articulating arms to hold handled items or minimize weight held in the hand • Use two hands rather than one • Alternate between hands • Sharpen cutting tools to reduce force requirements during use
Gripping an unsupported object(s) weighing 10 or more lbs. per hand or gripping with a force of 10 or more pounds per hand, more than 4 hours total per day	• Reduce weight of tool or object • Rotate jobs between workers • Use balancers, adjustable fixtures, articulating arms to hold handled items or minimize weight held in the hand • Use two hands rather than one • Alternate between hands • Sharpen cutting tools to reduce force requirements during use • Preventive maintenance of tools to reduce high hand forces • Use bench mounted adapters to provide more leverage

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
HIGHLY REPETITIVE MOTIONS	
Using the same motion with little or no variation every few seconds (excluding keying activities) more than 6 hours total per day	• Rotate jobs with other workers, varying the types of motion • Use job enlargement, increase the number of tasks performed by the worker, varying the types of movement • Reduced the speed of the motions if possible • Use mechanical assists • Use multifunction tools
Using the same motion with little or no variation every few seconds (excluding keying activities) combined with wrists bent in flexion 30^{o} or more or in extension 45^{o} or more or in ulnar deviation 30^{o} or more, and high, forceful exertions with the hand(s), more than 2 hours total per day	• Re-orient or move objects into positions where bent wrists are eliminated • Rotate jobs with other workers, varying the types of motion • Use tools (with power grip) if exertions are required • Provide jig/vice to hold parts reducing forceful grasping and allowing the use of two hands • Use mechanical assists • Use multifunction tools
Intensive keying for more than 7 hours total per day, or combined with awkward postures for more than 4 hours total per day	• Enlarge the job to include tasks other than keying • Provide equipment to reduce awkward postures such as wrist rests, arm rests, adjustable keyboard shelves • Rearrange workstation to eliminate awkward postures e.g. raise monitor, lower keyboard, bring mouse closer to keyboard • Utilize voice-recognition software • Utilize software macros that automate repetitive keystrokes • Schedule breaks

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
REPEATED IMPACT	
Using the hand (heel/base of palm) as a hammer more than once per minute more than 2 hours total per day	• Use rubber mallets, bean bags, or other padded tools to strike with instead of the palm • Press objects into place using levers, or hydraulic or pneumatic tools • Redesign assembly processes to avoid the need to pound parts in by hand • Use viscoeleastic padded palm pads to reduce impact • Cover sharp or hard objects with pads • Use different types of palm button guards such as light sensors for manual activation of equipment
Using the knee as a hammer more than once per minute more than 2 hours total per day	• Use tools that don't require knee kicks, such as power stretchers for carpet laying, or long handled mallets. • Press objects into place using levers, or hydraulic or pneumatic tools. • Relocate knee switches so that the thigh or the foot presses them. • Redesign processes to avoid the need to pound parts in by knee

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
HEAVY, FREQUENT or AWKWARD LIFTING	
Heavy lifting	• Reduce weight of load • Increase weight of load so that it requires mechanical assist • Reduce the capacity of the container • Use slides, gravity chutes to eliminate lifting • Use mechanical assist such as overhead hoist, manipulator, vacuum lift, pneumatic balancer, forklift • Use telescoping extendible conveyors with powered belts that reach deep into trailers • Reduce the horizontal distance of the load away from the body by reducing the size of the packaging • Reduce the horizontal distance of the load away from the body by removing barriers, obstacles that make access to the object difficult • Team lift the object with two or more workers • Improve layout of work process so the need to move materials is minimized • Provide handholds which increase lifting capability up to 15%
Frequent lifting	• Use mechanical assist such as overhead hoist, manipulator, vacuum lift, pneumatic balancer, forklift • Reorganize work method to eliminate repeated handling of the same object • Rotate workers to jobs with light or no manual handling • Use slides, gravity chutes to eliminate lifting • Use mobile storage racks to avoid unnecessary loading and unloading

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
Awkward lifting	• Redesign workstation layout to eliminate trunk twisting by locating objects within arm's reach • Design workstation with adjustable heights to eliminate bent forward posture when lifting • Eliminate the use of deep shelves that require a worker to bend and reach for objects. • Store objects at 30" off the floor • Provide sturdy walk-up ladder with handrails to access stored parts on high shelves/racks. • Provide rigid containers to better control the load

Table 10 Core Ergonomic Control Methods – Examples

Hazard	Ergonomic Control Methods
HAND-ARM VIBRATION	
Segmental vibration	• Select power tools with lower vibration emission levels • Provide regular maintenance to eliminate vibrations caused by imbalanced mechanical parts e.g. grinding wheels • Increased tool weight could reduce vibration transmitted to the hands, though cautions should be taken not to introduce other risk factors • Using balancers, isolators, damping materials, articulating arms, vertical suspension, and counter weighting to reduce grip requirements and provide an alternative transmission route for vibrational energy • Use battery operated rather than air powered tools where possible • Isolate vibration between source and hand by providing handles with a well designed mass-spring system or anti-vibration gloves • Tools should have a high power to weight ratio, have low torque with a cutoff rather than a slip-clutch mechanism and have handles with a non-slip surface to reduce the need to grip tightly. • Reduce vibration exposure duration
Note: This table provides examples of how the core ergonomics principles can be used to reduce exposure to musculoskeletal hazards. These examples are a selection from the rulemaking file.	

Ergonomics Awareness Education

For Employees in Caution Zone Jobs and Their Supervisors

Attendance Roster

Date:_____

NAME	SIGNATURE	

Certificate of Achievement

_____

Has Completed The Ergonomics Awareness Education Program
As Required by the Ergonomics Rule of the State of Washington

_____ _____

Date **Employer**